UNIT 1 - ENERGY
SECTION 3 - ENERGY CONSERVATION

COST-EFFECTIVE BUYING

Adapted from: Knowledge is Power by the Watt Watchers of Texas

Background Information

When we feel compelled to buy a more fashionable garment or a stereo, VCR, or boat, we do so with satisfaction in the knowledge that the purchase will enrich our lives. We buy labor-saving appliances because they will minimize our work and give us more time for other activities (e.g., leisure).

Consider the motivational factors for purchasing an "energy-saving" heating or cooling system. One might name convenience, dependability, good servicing support, brand name, low first cost, low cost to operate, and estimated future energy/money savings as factors influencing the decision to purchase. That last factor, estimated future energy/money savings, reflects the consumer's awareness of the rising cost of energy and his or her determination to reduce energy bills, save money, and as a result, save energy as well.

We expect the heating and cooling system to eventually "pay for itself." We calculate how much time will pass before the monthly savings offset the purchase price. Simple payback is the quotient of the total installed cost divided by the first year's dollar savings. If tax credits are available, they should be subtracted from the installed cost. The inverse of simple payback is the first year's rate of return. An example will help clarify this:

You purchase a high efficiency air-conditioner to replace an older model. It costs $360 installed and is estimated to save you $10 each month it operates, or $40 a year. Simple payback is $360 divided by $40/year, or 9 years. Rate of return for first year is ($40/$360) 100, or 11.1%.

These cost figures enable us to compare one purchase option against another. A more accurate analysis would take into account factors such as interest, taxes, and inflation. Interest, for example, is always a factor because, even if we pay cash, we must consider the interest our capital would have earned had it been otherwise invested. Taxes are a factor because the interest we pay on a loan (finance charge) can be an allowable deduction on our income tax return, and the interest which we may receive on our capital, otherwise invested, is taxable. Inflation is a factor because it has been with us a long time and because the price of energy will rise.

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The money you save by replacing a worn-out energy-consuming appliance with a more efficient one adds up and will eventually repay you for making the purchase, if the payback time is less than the appliance's lifetime. Simple payback is computed by:

Total installed dollar cost / Annual dollar savings

The first-year rate of return may be computed by:

Annual dollar savings / System's total installed dollar cost

1. You are insulating your attic and can choose one of the following options:

    Insulation A: Installed Cost = $200 Annual Savings = $120
    Insulation B: Installed Cost = $325 Annual Savings = $145

    Payback: Insulation A = _____ years Insulation B = _____ years

    Rate of return on your investment:
        Insulation A = _____ % Insulation B = _____ %

    Which one do you choose? _____

2. You are planning to install a new water heater. Water heater A has thicker wall insulation. Water heater B is a solar water heater that only uses purchased energy when not enough solar energy is available.

    Water heater A: Installed Cost = $325 Annual Savings = $19
    Water Heater B: Installed Cost = $1475 Annual Savings = $150

    Payback: Water Heater A = _____years   Water Heater B = _____years

    Rate of Return on your investment:
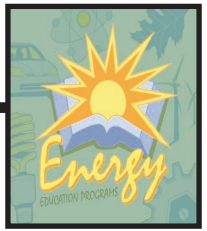   Water Heater A = _____% Water Heater B = _____%

    Which one do you choose? _____

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3. Your window unit air conditioner no longer works. You can choose one of the following room air conditioners with the following results:

      Air Conditioner A Installed Cost = $220 Annual Savings = $15
      Air Conditioner B Installed Cost = $435 Annual Savings = $35

      Payback: Air Conditioner A = _____years   Air Conditioner B = _____years

      Rate of Return on your investment: Air Conditioner A = _____% Air Conditioner B = _____%

      Which one do you choose? _____

4. Collect the energy rating labels from an appliance store for different appliances. Record the initial cost and expected annual savings to compare differenct models of the same type of appliance (compare refrigerators to refrigerators). Record and calculate the following:

      Appliance A initial cost = _____ Annual Savings = _____
      Appliance B initial cost = _____ Annual Savings = _____

      Payback: Appliance A = _____years   Appliance B = _____years

      Rate of return on your investment: Appliance A = _____% Appliance B = _____%

      Which one do you choose? _____

Extension

Based only on operating costs (i.e., ignoring maintenance cost) determine what the

payback would be on a new car of your choice.